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Fall 2005 MEAP Science

Standard Setting Performance Level Descriptors (PLDs)

There are four Performance Levels in science:

(1) Exceeded Michigan Standards
(2) Met Michigan Standards
(3) Basic
(4) Apprentice

The Standard Setting PLDs define in detail what students at each grade and performance level should know and be able to do in relation to the Michigan science curriculum framework.

In September 2005, groups of Michigan educators were brought together to develop these PLDs, taking into account both the curriculum framework and the science assessments themselves. In January 2006, the PLDs were used by Michigan educators, parents, and community members to determine recommended cut scores between the performance levels. The recommended cut scores were formally adopted by the Michigan State Board of Education in January 2006.

In this document, only the first three levels are defined explicitly. The fourth level (*apprentice*) is defined as not meeting the requirements for the *basic* level.

The PLDs are presented in two ways:

1. Within grade level across performance levels. This presentation shows how performance progresses from one performance level to the next within each grade.

2. Within performance level across grades. This presentation shows how student performance progresses from one grade to another within each performance level.

The Science MEAP was given in the Fall in grades 5 and 8, and measured the science knowledge and skills expected at the end of grades 4 and 7.

MEAP Science Grade 5 Performance Level Descriptors (Across Performance Levels)
(Addresses Grade 4 Knowledge and Skills)

Basic (Level 3)	**Met (Level 2)**	**Exceeded (Level 1)**
With respect to the elementary school Michigan Science Curriculum Framework, a student who scored at the "Basic" level in science:	*With respect to the elementary school Michigan Science Curriculum Framework, a student who scores at the "Met" level in science:*	*With respect to the elementary school Michigan Science Curriculum Framework, a student who scored at the "Exceeded" level in science:*
• demonstrated a knowledge of earth, life and physical science; displayed limited recognition of relationships among these three branches of science.	• demonstrated knowledge, understanding and skill in earth, life and physical science by recognizing the relationships among ideas and concepts across these branches of science.	• demonstrated deep knowledge, understanding and skill in earth, life and physical science by generating or connecting the relationships among ideas and concepts across these branches of science.
• used his or her own knowledge to partially describe and/or partially explain real-world objects or events.	• used his or her own knowledge to describe and/or explain real-world objects or events.	• used his or her knowledge to describe and/or explain real-world objects and events as well as understand prediction of future observations and outcomes.
• gathered information for scientific problems from resources such as tables, graphs and text.	• proposed reasonable solutions for problems using scientific information from resources such as tables, graphs and text.	• solved problems using scientific knowledge and information from resources such as tables, graphs and text.
• demonstrated a limited capacity to judge evidence or develop scientific reasons for explanation of observations and events.	• judged and used evidence and reason to make a scientific explanation.	• has analyzed and reflected about real-world situations using his or her science knowledge and understanding.
• followed simple investigation procedures, indicated some difficulty with manipulation of materials, and had some difficulty interpreting graphs and diagrams.	• followed investigation procedures, manipulated simple materials, and interpreted graphs and diagrams.	• designed and followed investigation procedures, manipulated simple materials, interpreted graphs and diagrams, and drew conclusions.
• demonstrated incomplete knowledge about using tools to make observation and measurement.	• demonstrated knowledge of simple scientific tools to make observations and obtain measurement.	• demonstrated reliable knowledge for using simple scientific tools to observe and collect data as well as obtain accurate measurements.
• showed some ability to gather and prepare appropriate data from resources such as tables and bar graphs and text.	• prepared and used simple data tables and bar graphs.	• prepared appropriate and clearly labeled data tables and bar graphs to present scientific information.
• inconsistently understands scientific principles underlying examples of technology in everyday life.	• consistently recognized examples of technology and the underlying scientific principles in everyday life.	• consistently recognized examples of the use of scientific principles in everyday life while realizing the impact of such technology on the natural world.
• provided partially correct answers to questions that included some error or contradiction; answer lacked sufficient evidence or elaboration.	• provided complete and correct answers to questions; answers were supported with some evidence and some elaboration.	• correctly, completely, and thoroughly answered questions; answers provided examples, evidence, or elaboration.

MEAP Science Grade 8 Performance Level Descriptors (Across Performance Levels)
(Addresses Grade 7 Knowledge and Skills)

Basic (Level 3)	**Met (Level 2)**	**Exceeded (Level 1)**
With respect to the middle school Michigan Science Curriculum Framework, a student who scored at the "Basic" level in science:	*With respect to the middle school Michigan Science Curriculum Framework, a student who scores at the "Met" level in science:*	*With respect to the middle school Michigan Science Curriculum Framework, a student who scored at the "Exceeded" level in science:*
• demonstrated a knowledge of earth, life and physical science; did not, however, recognize relations among these three branches of science.	• demonstrated knowledge, understanding and skill in earth, life and physical science by recognizing the relationships among ideas and concepts across these branches of science.	• demonstrated deep knowledge, understanding and skill in earth, life and physical science by generating or connecting the relationships among ideas and concepts across these branches of science.
• used his or her own knowledge to partially describe and/or partially explain real-world objects or events.	• used his or her own knowledge to describe and/or explain real-world objects or events.	• used his or her knowledge to describe and/or explain real-world events as well as understand prediction of future observations and outcomes.
• gathered information for scientific problems from resources such as tables, graphs and text.	• developed solutions for problems using scientific information from resources such as tables, graphs and text.	• solved problems using scientific knowledge and information from resources such as tables, graphs and text.
• demonstrated a limited capacity to judge evidence or develop scientific reasons for explanation of observations and events.	• judged and used evidence and reason to make a scientific explanation.	• has analyzed and reflected about real-world situations using his or her science knowledge and understanding.
• contributed to a scientific investigation; performed less complex tasks used to observe, measure, collect and record scientific information; had some knowledge about scientific equipment; exhibited partial use of the metric system.	• designed investigations and knew the sequence of steps for a scientific investigation; identified uses for scientific equipment as well as used the metric system for measurement.	• designed and critiqued investigations; knew and applied the sequence of steps for making a scientific investigation; readily identified and understood the appropriate use of scientific equipment; readily understood and used the metric system.
• predicted obvious outcome based on scientific knowledge.	• consistently predicted reasonable outcomes based on scientific knowledge.	• consistently predicted complex outcomes based on scientific knowledge.
• considered alternative explanations for observations or events with some scientific reasons supporting conclusions.	• evaluated alternative explanations for observations or events based on scientific knowledge.	• evaluated alternative explanations for observations and events offering evidence for making conclusions.
• recognized some forms of technology; did not, however, anticipate the extent of benefits or risks that could be associated with technology.	• applied scientific concepts to technical problems and explained the intended results of the application with anticipation of the advantages and the risk of the application.	• applied scientific concepts to technical problems recognizing the advantages and possible risks from new technology beyond immediate application.
• provided partially correct answers to questions that could include some error or contradiction; answer lacked sufficient evidence or elaboration.	• provided complete answers to questions without contradiction; the answer was supported with some evidence and some elaboration.	• correctly, completely and thoroughly answered questions without contradiction; answers provided examples, evidence or elaboration.

MEAP Science "Met Standards" Performance Level Descriptors (Across Grades 5 and 8)
(Addresses Grades 4 and 7 Knowledge and Skills)

Grade 5	**Grade 8**
With respect to the elementary school Michigan Science Curriculum Framework, a student who scores at the "Met" level in science:	*With respect to the middle school Michigan Science Curriculum Framework, a student who scores at the "Met" level in science:*
• demonstrated knowledge, understanding and skill in earth, life and physical science by recognizing the relationships among ideas and concepts across these branches of science.	• demonstrated knowledge, understanding and skill in earth, life and physical science by recognizing the relationships among ideas and concepts across these branches of science.
• used his or her own knowledge to describe and/or explain real-world objects or events.	• used his or her own knowledge to describe and/or explain real-world objects or events.
• proposed reasonable solutions for problems using scientific information from resources such as tables, graphs and text.	• developed solutions for problems using scientific information from resources such as tables, graphs and text.
• judged and used evidence and reason to make a scientific explanation.	• judged and used evidence and reason to make a scientific explanation.
• followed investigation procedures, manipulated simple materials, and interpreted graphs and diagrams.	• designed investigations and knew the sequence of steps for a scientific investigation; identified uses for scientific equipment as well as used the metric system for measurement.
• demonstrated knowledge of simple scientific tools to make observations and obtain measurement.	• consistently predicted reasonable outcomes based on scientific knowledge.
• prepared and used simple data tables and bar graphs.	• evaluated alternative explanations for observations or events based on scientific knowledge.
• consistently recognized examples of technology and the underlying scientific principles in everyday life.	• applied scientific concepts to technical problems and explained the intended results of the application with anticipation of the advantages and the risk of the application.
• provided complete and correct answers to questions; answers were supported with some evidence and some elaboration.	• provided complete answers to questions without contradiction; the answer was supported with some evidence and some elaboration.

MEAP Science "Exceeded Standards" Performance Level Descriptors (Across Grades 5 and 8)
(Addresses Grades 4 and 7 Knowledge and Skills)

Grade 5	**Grade 8**
With respect to the elementary school Michigan Science Curriculum Framework, a student who scored at the "Exceeded" level in science:	*With respect to the middle school Michigan Science Curriculum Framework, a student who scored at the "Exceeded" level in science:*
• demonstrated deep knowledge, understanding and skill in earth, life and physical science by generating or connecting the relationships among ideas and concepts across these branches of science.	• demonstrated deep knowledge, understanding and skill in earth, life and physical science by generating or connecting the relationships among ideas and concepts across these branches of science.
• used his or her knowledge to describe and/or explain real-world objects and events as well as understand prediction of future observations and outcomes.	• used his or her knowledge to describe and/or explain real-world events as well as understand prediction of future observations and outcomes.
• solved problems using scientific knowledge and information from resources such as tables, graphs and text.	• solved problems using scientific knowledge and information from resources such as tables, graphs and text.
• has analyzed and reflected about real-world situations using his or her science knowledge and understanding.	• has analyzed and reflected about real-world situations using his or her science knowledge and understanding.
• designed and followed investigation procedures, manipulated simple materials, interpreted graphs and diagrams, and drew conclusions.	• designed and critiqued investigations; knew and applied the sequence of steps for making a scientific investigation; readily identified and understood the appropriate use of scientific equipment; readily understood and used the metric system.
• demonstrated reliable knowledge for using simple scientific tools to observe and collect data as well as obtain accurate measurements.	• consistently predicted complex outcomes based on scientific knowledge.
• prepared appropriate and clearly labeled data tables and bar graphs to present scientific information.	• evaluated alternative explanations for observations and events offering evidence for making conclusions.
• consistently recognized examples of the use of scientific principles in everyday life while realizing the impact of such technology on the natural world.	• applied scientific concepts to technical problems recognizing the advantages and possible risks from new technology beyond immediate application.
• correctly, completely, and thoroughly answered questions; answers provided examples, evidence, or elaboration.	• correctly, completely and thoroughly answered questions without contradiction; answers provided examples, evidence or elaboration.

MEAP Science "Basic" Performance Level Descriptors (Across Grades 5 and 8)
(Addresses Grades 4 and 7 Knowledge and Skills)

Grade 5	**Grade 8**
With respect to the elementary school Michigan Science Curriculum Framework, a student who scored at the "Basic" level in science:	*With respect to the middle school Michigan Science Curriculum Framework, a student who scored at the "Basic" level in science:*
• demonstrated a knowledge of earth, life and physical science; limited recognition of relationships among these three branches of science.	• demonstrated a knowledge of earth, life and physical science; did not, however, recognize relations among these three branches of science.
• used his or her own knowledge to partially describe and/or partially explain real-world objects or events.	• used his or her own knowledge to partially describe and/or partially explain real-world objects or events.
• gathered information for scientific problems from resources such as tables, graphs and text.	• gathered information for scientific problems from resources such as tables, graphs and text.
• demonstrated a limited capacity to judge evidence or develop scientific reasons for explanation of observations and events.	• demonstrated a limited capacity to judge evidence or develop scientific reasons for explanation of observations and events.
• followed simple investigation procedures, indicated some difficulty with manipulation of materials, and had some difficulty interpreting graphs and diagrams.	• contributed to a scientific investigation; performed less complex tasks used to observe, measure, collect and record scientific information; had some knowledge about scientific equipment; exhibited partial use of the metric system.
• demonstrated incomplete knowledge about using tools to make observation and measurement.	• predicted obvious outcome based on scientific knowledge.
• showed some ability to gather and prepare appropriate data from resources such as tables and bar graphs and text.	• considered alternative explanations for observations or events with some scientific reasons supporting conclusions.
• inconsistently understands scientific principles underlying examples of technology in everyday life.	• recognized some forms of technology; did not, however, anticipate the extent of benefits or risks that could be associated with technology.
• provided partially correct answers to questions that included some error or contradiction; answer lacked sufficient evidence or elaboration.	• provided partially correct answers to questions that could include some error or contradiction; answer lacked sufficient evidence or elaboration.